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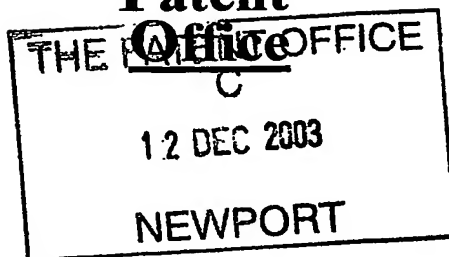
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# Request for grant of a patent

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Your reference

LPT0589

12DEC03 E858963-2 002806  
P01/7700 0.00-0328788.5 NONE

Patent application number  
(The Patent Office will fill in this)

0328788.5

12 DEC 2003

Full name, address and postcode of the or of  
each applicant (underline all surnames)

Gursharan Singh Chana  
Kenwood  
57 Bracebridge Road  
Sutton Coldfield  
B74 2SL

Patents ADP number (if you know it)

8336646001

If the applicant is a corporate body, give the  
country/state of its incorporation

Title of the invention

IMPROVED TARGETING DEVICE

Name of your agent (if you have one)

Barker Brettell

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)

138 Hagley Road  
Edgbaston  
Birmingham  
B16 9PW

Patents ADP number (if you know it)

7442494002✓

5. Priority: Complete this section if you are  
declaring priority from one or more earlier  
patent applications, filed in the last 12 months.

Country

Priority application number  
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Date of Filing  
(day/month/year)

7. Divisionals, etc: Complete this section only if  
this application is a divisional application or  
resulted from an entitlement dispute (see note  
f)

Number of earlier application

Date of filing  
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8. Is a Patents Form 7/77 (Statement of  
inventorship and of right to grant of a patent)  
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if:  
a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant,  
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c) any named applicant is a corporate body.  
Otherwise answer NO (See note(d))

# Patents Form 1/77

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Description 07 + 07

Claim(s) -

Abstract -

Drawing(s) 01 + 01

DM

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Priority documents -

Translations of priority documents -

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) -

Request for preliminary examination -  
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11. I/We request the grant of a patent on the basis of this application.

Signature

Barker Brettell

Barker Brettell

Date

11.12.2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Ms. Lucy P. Trueman

Tel: 0121 456 1364

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Patents Form 1/77

## IMPROVED TARGETING DEVICE

The present invention relates to an improved targeting device, particularly for use in hip surgery and more particularly for use in hip replacement surgery, and its use in surgery, particularly minimally invasive surgery.

When performing hip replacement surgery, in particular, it is essential to be able to accurately determine where the centre of the osteomoised base of the femoral neck lies to allow correct reaming of the femoral neck and correct fitting of the replacement head onto the femoral neck.

The position of the femoral head does not always assist in determining the position of the centre of the osteomoised base of the femoral neck as the head may not be centrally positioned in relation to the femoral neck.

Accordingly there is the need for a targeting device which is suitable to allow the position of the centre of the osteomoised base of the femoral neck to be determined and that can be used in minimally invasive surgical methods.

The present invention provides in a first aspect a targeting device for use in minimally invasive hip replacement surgery to allow the position of the centre of the osteomoised base of the femoral neck to be located, which device comprises at least a first component suitable for receipt of a first guide wire and a second component suitable for receipt of a second guide wire, wherein the first and second components are spaced apart from and parallel to one another and means is provided to alter the distance between the first and second components and means is provided to maintain the first and second components in a predetermined position relative to each other.

The first and second components may be identical in configuration.

5 Preferably each of the first and second components is an elongate three dimensional shape, such as a cylinder. Each of the first and second components is preferably 2 to 10cm in length, more preferably 3 to 8cm and most preferably 4 to 6cm.

10 A central bore is preferably provided along the centre of each of the first and second component to receive a guide wire. The bore may have a diameter of 2 to 5mm, preferably 3 to 4mm, most preferably 3.3 to 3.5mm.

15 Each of the first and second components is most preferably cylindrical in shape with a central bore extending along its length, i.e. each of the first and second components is tubular.

20 The means provided to space the first and second components from each other and maintain the first and second components parallel to each other may be any suitable means.

25 Preferably the first component is provided with one or more runners, the or each runner is elongate and extends such that its longitudinal axis is perpendicular to that of the first component. Where there are two runners the runners are parallel to each other. The or each runner may be up to 10cm in length, preferably up to 8cm and most preferably up to 5cm.

30 The second component is preferably provided with means to movably, preferably slidably, engage the or each runner. The second component is positioned on the or each runner such that the longitudinal axis of the second component lies perpendicular to that of the or each runner and parallel to the longitudinal axis of the first component.

One or more springs may be provided between the first and second components to assist movement of the second component away from the first component, preferably the or each spring is provided around the or  
5 each runner.

The means to alter the distance between the first and second components may be any suitable means. The distance between the first and second components could be up to 10cm, preferably up to 8cm, more preferably  
10 up to 5cm.

The means to maintain the position of the second component relative to the first component may be any suitable means and is preferably the same means as the means to alter the distance between the first and second  
15 components.

Preferably there is provided a screw threaded bar received by corresponding screw threaded portions on each of the first and second components. The portions of the first and second components receiving  
20 the bar are preferably positioned on a common axis extending perpendicular to and between the first and second components. The portions of first and second components receiving the bar are preferably protrusions having corresponding screw threaded apertures therethrough.

25 The screw threaded bar is preferably provided with a suitable means to cause its rotation, for example a knob.

The first component is preferably mounted on an elongate support. The elongate support preferably has a handle portion distal from the first  
30 component. The first component is preferably mounted on the elongate support perpendicular to the longitudinal axis of the elongate support.

In a most preferred embodiment the longitudinal axes of the or each runner and the screw threaded bar all lie parallel to the longitudinal axis of the elongate support and the longitudinal axes of the first and second components each lie perpendicular to these axes and are spaced apart from and parallel to each other.

Preferably the device comprises a first component and a second component only.

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The targeting device may be manufactured from any suitable material, for example metal such as stainless steel or surgical steel or a plastics material.

15 In a second aspect the targeting device of the present invention may be used in a method of locating the centre of the osteomoised base of the femoral neck, which method comprises:

-measuring the diameter of the femoral neck;

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-dividing the diameter of the femoral neck by two to give value X and setting the distance between the first and second components of the targeting device as X;

-determining the mid line through the femoral neck in the AP plane and running a guide wire along this line through the first component of the targeting device of the present invention;

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-determining the centre of the osteomoised femoral neck by rotation of the second component around the guide wire running through the first component.

Preferably a second guide wire is passed through the second component to mark the central longitudinal axis of the femoral neck. The targeting device may then be removed leaving the guide wires in place.

- 5    Preferably the diameter of the femoral neck is measured using callipers.

A specific embodiment of the present invention will now be described, by means of example only, with reference to the drawings, in which:

- 10        Figure 1 shows, in plan view, a schematic drawing of a targeting device according to the present invention.

Figure 1 shows a targeting device 1 suitable for use in minimally invasive hip replacement surgery. The device 1 comprises an elongate support 2  
15    having a handle portion 3 at one end having a central longitudinal axis B. Secured to the end of the elongate support distal from the handle portion 3, by welding, is a first component 4 suitable for receiving a guide wire.

The first component 4 comprises a tube having a central longitudinal axis  
20    A lying perpendicular to the longitudinal axis B of the elongate support 2.

Two elongate runners 5, 6 are provided extending tangentially to the first component 4. The runners 5, 6 are parallel to and spaced apart from each other and their central longitudinal axes C1, C2 run parallel to axis B of  
25    the elongate support 2. The runners 5, 6 are secured to the first component 4 by welding.

A second component 7 is slidably mounted on the runners 5, 6. The second component 7 comprises a tube having a central longitudinal axis D  
30    parallel to axis A of the first component 4.



The second component 7 is provided with two suitably sized shoulders 8a, 8b having apertures 9a, 9b (not shown) therein to receive the runners 5, 6. The shoulders 8a, 8b are positioned such that the runners form an identical tangent to the second component 7 as they do to the first component 4.

Each of the first 4 and second 7 components is provided with an integral protrusion 10a, 10b positioned diametrically opposite to the runners 5, 6 and having a screw threaded aperture therethrough. A correspondingly screw threaded bar 11 is provided extending through the apertures in the protrusions 10a, 10b and rotation of this bar 11 causes movement of the second component 7 relative to the first component 4 along the runners 5, 6. The bar 11 is provided with a knob 12 to assist in its manual rotation.

Springs 13a, 13b are provided around the runners 5, 6 between the first 4 and second 7 components to assist movement of the second component 7 away from the first component 4.

In use the targeting device of the present invention assists in locating the central longitudinal axis of the femoral neck. In minimally invasive hip replacement surgery as described in International Patent Publication No WO 03/065906 of the same inventor the femoral neck osteotomy is performed and the osteomised femur is exposed as described. To locate the centre of the osteomised femoral neck, in the AP and lateral plane, the diameter of the femoral neck is measured with callipers and the radius is calculated by dividing the diameter by two.

The distance of the centre of the second component 7 from the centre of the first component 4 is adjusted by rotation of the screw threaded bar 11 until the distance is the same as the measured diameter divided by two.

The centre line of the femoral neck in the AP plane is determined and a first guide wire is inserted in line with this centre line. The first guide wire is passed through the first component 4 of the targeting device 1. The second component 7 of the targeting device is then used to locate the centre in the AP and lateral plane by rotation around the first guide wire. The centre is then marked with a second guide wire and the targeting device can be removed leaving the guide wires in place.

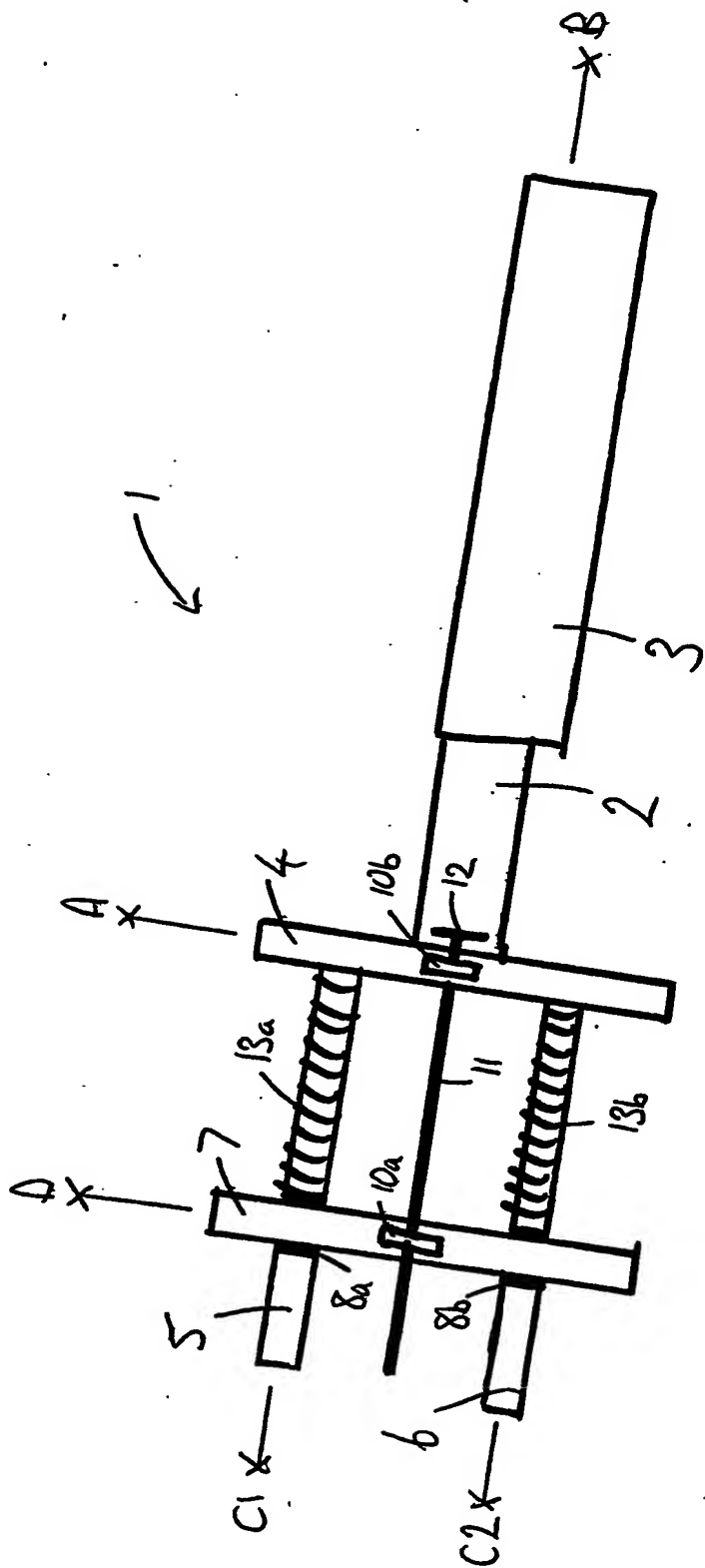
The femoral neck can then be reamed accurately and centrally and the resultant prosthesis will be accurately and centrally positioned.

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